

Flight in America, 1784–1919

Jacques Alexandre, Caesar Charles, and M.N. Robert became the first human beings to fly aboard a hydrogen balloon, rising above the rooftops of Paris on December 1, 1783. Letters from Americans living in France carried the earliest news of the invention of the balloon across the Atlantic.

June 24, 1784, is an important, if entirely forgotten, day in American history. The announcement that Peter Carnes, a lawyer and tavern keeper from Bladensburg, Maryland, would fly a balloon in Howard Park had attracted “a numerous and respectable Congress of People” to Baltimore that day. The entire city had gone “Balloon Mad,” according to one disgruntled clerk. “Every store but our own and a few others were shut.”¹

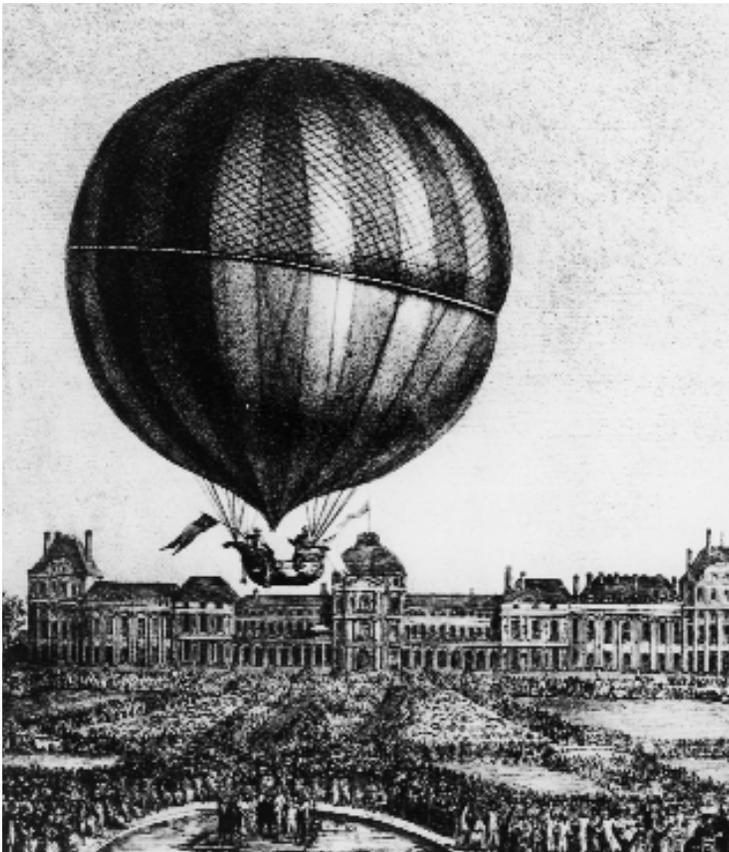
Joseph Michel and Jacques Etienne Montgolfier had flown the world’s first small balloon from the town square of Annonay, in the south of France, on June 4, 1783, barely one year before. The first human beings had flown from Paris only seven months before, on November 21, 1783. Carnes, who had never seen a balloon and who had little more than vague descriptions

to go on, had completed work on his hot air craft and sent it aloft on its first tethered flight from Bladensburg on June 14, 1784. That flight, and all of those made early on June 24, were tethered ascents with no one on board. Carnes, who weighed in at 234 pounds, was apparently too heavy for the small balloon to lift.

As Carnes was preparing to send the balloon aloft for the last time that afternoon, however, a 13-year-old lad named Edward Warren stepped out of the crowd and volunteered to ascend in the “splendid chariot” dangling beneath the multicolored silk envelope. Baltimore newspapers assured their readers that young Edward behaved “with the steady fortitude of an old voyager.” He “soared aloof” to the cheers of the crowd, “which he politely acknowledged by a significant wave of his hat.” When Warren returned to the “terrene element” a few minutes later, a collection was taken up so that he might have a reward with a “solid rather than an airy foundation, and of a species which is ever acceptable to the residents of this lower world.”²

An American had flown from American soil for the first time, and the world would never be quite the same. The winds of change were sweeping across America and Europe. The war that had begun with a few scattered shots fired on the Lexington green had ended just a year before with the signing of the Treaty of Paris in 1783. It seemed only fitting that a new nation which promised unprecedented freedom and opportunity should be born at the very moment when human beings took their first faltering steps toward achieving the freedom of the skies. Only a few months before Edward Warren ascended from Baltimore, Benjamin Franklin had overheard a Parisian suggest that the balloon was a thing of little practical value. Franklin had turned to the fellow and asked: “Of what use is a new born Babe?” If human beings could fly, after all, was there anything they could not achieve?

Peter Carnes and Edward Warren launched America on its love affair with flight. Throughout the 19th century, Americans would thrill at the sight of a colorful balloon, and its even more col-



orful pilot, rising above the local Fourth of July celebration or county fair; listen to tales of the observation balloonists employed by both Blue and Gray during the Civil War; and cluck their tongues at the fate of the latest daredevil to fall victim to an aerial mishap.

Still other Americans, like James Buchanan, of Lexington, Kentucky, abandoned the balloon, a captive of the winds, and became determined to “soar as high as the eagle” on wings that they had designed and built themselves. Buchanan conducted an unsuccessful test of an ornithopter powered by “a Capillary Steam Engine for Navigating the Air,” in 1824.³ He was the first of a long string of aerial dreamers who populated the American landscape during the years prior to 1890. Richard Oglesby Davidson was typical of the breed. He entered the field in 1841 with a proposal for a bird-shaped, human-powered ornithopter, and was still circulating through Confederate Army camps 23 years later, soliciting funds for an aerial weapon guaranteed to bring the Yankees to their knees.⁴

While 19th-century Americans dreamed of flapping wing contraptions with artificial bird beaks, European engineers began the serious business of exploring the fundamental principals of flight technology. The history of the airplane is rooted in several centuries of European research into the forces operating on a body immersed in a fluid stream, culminating in 100 years of active flight experimentation. At the beginning of the 19th century, the Englishman Sir George Cayley (1773–1857) defined the problem of flight, conducted critically important experiments in aerodynamics, designed and built the first successful gliders, and inspired the several generations of enthusiasts who would achieve the ancient dream of winged flight.

The century that followed witnessed the introduction of new engineering instruments like the wind tunnel, important studies in aerodynamics and aircraft stability, and the appearance of practical internal combustion engines, all of which contributed to the development of powered, controlled, heavier-than-air flight. By the time of his death in a glider crash in August 1896, less than half a century after the death of Sir George Cayley, the German pioneer Otto Lilienthal (1848–1896) had completed as many as 2,000 flights in 18 distinct glider designs.

With the death of Lilienthal, however, leadership in aeronautical research passed to the

United States, where pioneers like Octave Chanute (1832–1910) and Samuel Pierpont Langley (1834–1906) were setting the stage for the invention of the airplane. On May 6, 1896, Langley, the third Secretary of the Smithsonian Institution, succeeded in launching the first reasonably large, steam-powered model aircraft on flights of up to three-quarters of a mile over the Potomac River. Later that year, Chanute, a prominent American civil engineer and internationally recognized authority on the problems of flight, led a band of experimenters into the sand dunes ringing the southern shore of Lake Michigan, east of Chicago, Illinois, where they flew a series of gliders, including a very advanced biplane that pointed the way to the future of aircraft structures.

Wilbur (1867–1912) and Orville Wright (1871–1948), the proprietors of a bicycle sales, repair, and manufacturing shop in Dayton, Ohio, wrote both to the Smithsonian Institution and to Octave Chanute in 1899 and 1900, respectively, requesting information on aeronautics and announcing their decision to begin their own experiments. The Wrights were superb, self-trained engineers who developed an extraordinarily successful research strategy that enabled them to overcome one set of challenging problems after another, the full extent of which few other experimenters had even suspected. Their ability to visualize machines that had not yet been built, and to imagine the complex interplay of forces on such a device, as well as their capacity to recognize links between apparently unrelated technologies, were among the factors that enabled them to move far beyond their predecessors in the field.

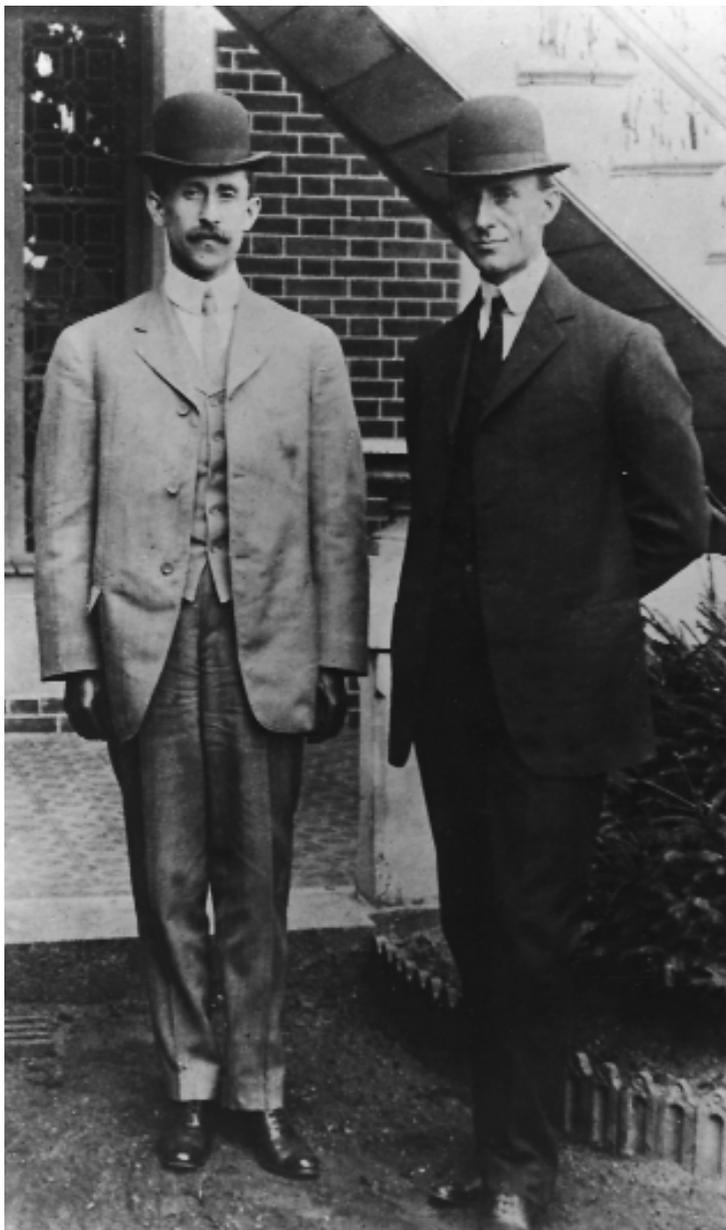
The Wright brothers progressed toward the development of a practical flying machine through an evolutionary chain of seven experimental aircraft: one kite (1899), three gliders (1900, 1901, and 1902), and three powered airplanes (1903, 1904, and 1905). Each of these aircraft was a distillation of the lessons learned and the experience gained with its predecessors. It was not all smooth sailing. Frustration and disappointment were as much a part of the process as the euphoria of discovery. In the fall of 1901, puzzled by the failure of their earliest gliders to match calculated performance, the brothers built their own wind tunnel and designed a pair of brilliantly conceived balances that produced the precise bits of data required to make accurate performance calculations.

Orville and Wilbur Wright. Courtesy Special Collections and Archives, Wright State University.

The Wrights designed and, for the most part, prefabricated their aircraft in Dayton. Initially, however, they had to go elsewhere to fly. From 1900 to 1903, they tested their gliders, and taught themselves to fly at the Kill Devil Hills, a range of low sand dunes some four miles south of the little village of Kitty Hawk on the Outer Banks of North Carolina. Here they found all that they required to conduct their experiments: strong, steady winds, hills that were perfect for gliding, soft sand for landing, and friendly neighbors to assist when required. It was here, where the Wrights had flown for three previous seasons, that they made the first four sustained, powered flights under the control of the pilot between 10:35 a.m. and noon on the morning of December 17, 1903.

The brothers had succeeded, but a great deal of work remained to be done. Over the next two years they continued their work in a cow pasture near Dayton. By the fall of 1905, they had achieved their goal of a practical flying machine capable of remaining in the air for extended periods of time and operating under the full control of the pilot. The air age had begun. Unwilling to unveil their technology without the protection of a patent and a contract for the sale of airplanes, the Wrights did not make public flights until 1908.

By that time, the Wrights were no longer alone in the air. As early as 1906, Alberto Santos Dumont, a wealthy Brazilian living in Paris, France, had succeeded in making the first successful public flight in Europe. His machine, and those that would follow over the next two years, were far more primitive than the Wright aircraft, and were equipped with dangerous and unsatisfactory control systems. Still, the first public flight in Europe of one kilometer, and the first circular flight by a European aircraft were flown



while the Wright brothers remained on the ground, attempting to protect and sell their invention.

Other Americans were taking to the air, as well. Glenn Hammond Curtiss, a veteran of the Aerial Experiment Association organized by Samuel Langley's old friend Alexander Graham Bell, won the Scientific American Trophy for a straight-line flight of one kilometer on July 4, 1908.

By the spring of 1908, the Wrights had received their patents and had signed contracts for the sale of airplanes to the U.S. Army and a French syndicate. They rebuilt their old 1905 machine with controls that could be operated

from the new upright seats and returned to Kitty Hawk to polish their flying skills and accustom themselves to the new controls. Then Wilbur was off to France, where he flew in public for the first time near Le Mans on August 8. The Europeans, many of whom had doubted the Wright claims, were astounded with the ease at which Wilbur maneuvered his machine through the air. The skeptics were silenced as this quintessential American quickly became the most celebrated figure in Europe.

Orville made his first public flights to demonstrate the airplane to officials of the U.S. Army at Fort Myer, Virginia, in September. After a series of performances quite as spectacular as those his brother was providing for spectators in Europe, Orville suffered a crash on September 17. The result of a cracked propeller, the accident severely injured Orville, and took the life of his passenger, Lieutenant Thomas Selfridge, who was also a veteran of the Aerial Experiment Association.

While recovering from his injuries, Orville and Katharine, the youngest of the Wright children, joined Wilbur in France. Kings, prime ministers, and the social elite of Europe came to watch the flying and to meet the Wrights, who were emerging as the first great international heroes of the new century. They were welcomed back to America in triumph and heaped with honors and awards.

The Wright Company was founded in 1910 with Wilbur as president, Orville as a vice-president, and a board of directors that included some of the most distinguished names in American business and finance.

Corporate headquarters were in New York, but the heart of the operation, the factory and the flying field, were located in Dayton. Huffman Prairie Flying Field, where the Wrights had flown in 1904 and 1905, became an internationally famous location once again when the already historic field became the home of the Wright School of Aviation. The fledgling pilots who earned their wings here included Marjorie Stinson, who soloed at age 20; pioneer naval aviator John Rodgers;

Calbraith P. Rodgers, the first man to fly from coast to coast; and Lieutenant Henry Harley “Hap” Arnold, the future commanding general of the U.S. Army Air Forces in World War II.

American aeronautical hegemony was short-lived, however. With war looming on the horizon, European leaders invested heavily in the new technology. Government officials and wealthy private citizens encouraged the development of aviation by sponsoring speed, altitude, and distance competitions, purchasing aircraft in considerable numbers, establishing aerial units in their armed forces, creating aeronautical laboratories, and funding research and development efforts. The United States, the birthplace of aviation, did not invest in aeronautics, and fell woefully behind Europe. By 1913, the U.S. Army could boast a grand total of six active pilots, while the entire U.S. aeronautical industry employed fewer than 170 employees—most of whom worked for Glenn Hammond Curtiss.

A motorcycle builder from Hammondsport, New York, Curtiss was the most successful of the handful of American aircraft builders who entered the field during the decade following the invention of the airplane, winning the first James Gordon Bennett trophy at the great air meet at Reims, France, in 1909, with a speed of just over 47 miles per hour. Curtiss was also the principal target of the lawsuits brought by The Wright Company in an attempt to halt infringement on the Wright patents. The Wrights won every decision handed down by the courts over the seven-year life of the basic suit, but Curtiss was always able to find an argument that would keep the

One of the few manufacturers of airplanes during WWI was The Dayton-Wright Airplane Company in Dayton, Ohio, that manufactured De Havilland-4s. Courtesy NCR Archives at Montgomery County Historical Society.



long and complex legal proceedings alive until finally brought to a halt by the creation of a U.S. patent pool in 1917.

Exhausted by business responsibilities and the patent suits in Europe and America, Wilbur Wright died of typhoid fever in 1912. Orville Wright sold his interest in The Wright Company in 1915. In spite of his legal problems, Glenn Curtiss had established himself as the only U.S. manufacturer operating at a European level, a major supplier of training aircraft to the U.S. government and flying boats to Allied navies. That fact alone is convincing proof that the Wright patent suits were not a major factor explaining the retarded growth of aviation in America prior to World War I, as is sometimes claimed. As noted, heavy European investment in aviation offers reason enough.

Americans flew into combat in World War I aboard aircraft that had been almost entirely designed, and for the most part manufactured, in Europe. By the Armistice, however, U.S. industry was producing the Liberty engines that would power American aircraft for the next decade, including the Fokker T-2 that made the first non-stop coast-to-coast flight in 1923, and the Douglas World Cruisers that completed the first aerial voyage around the globe the following year. Moreover, the advanced American designs that would have seen combat had the war continued into 1919 were available for record flights, such as the first aerial crossing of the Atlantic by the giant U.S. Navy flying boat, NC-4. From the legendary barnstormers to the earliest airmail operators, the pioneers of American commercial aviation began business with war surplus equipment.

The legacy of the American experience in World War I also included congressional investigations that underscored the problems of a limited market and high research and development costs faced by American airframe and engine manufacturers. Recognizing the growing importance of the airplane to national defense, domestic commerce, and international prestige, federal officials took a series of steps to strengthen, support, and regulate the aviation industry between 1915 and 1940.

The first and one of the most important of those steps came in 1915, when the Congress created the National Advisory Committee for Aeronautics (NACA). From the outset, the

NACA conducted programs that amply demonstrated the value of basic research in flight technology. Technical reports issued by the agency introduced U.S. aircraft designers to a host of improvements including revolutionary airfoils, improved propellers, engines, and instruments, and various streamlining techniques. NACA engineers experimented with wing flaps and other high-lift devices and explored innovative construction techniques and new materials that helped to set the stage for a new generation of aircraft designs that would emerge in the 1930s.

In the 1920s, a number of developments set the stage for a genuine revolution in which airplanes flying faster, higher, and farther than the pioneers had dreamed possible would absolutely shape the subsequent history of the American Century. Flight technology would redefine the way in which we fight our wars; open the distant corners of the globe to commerce; drive technological change in critical areas ranging from materials research to electronics and computers; and enormously expand our vision of the possible.

Given the historic importance of aerospace technology, the identification, preservation, and interpretation of historic sites, documents, and objects relating to the history of flight should be of concern to all of us who seek to better understand the foundations of the world in which we live. The approach of the centennial of powered, controlled, heavier-than-air flight in 2003 offers a special opportunity to focus on this aspect of our heritage. It is an opportunity that we should not allow to pass us by.

Notes

- ¹ Letterbook, Johannot Johnson and Company, MS. 497-8, Manuscript Division, Maryland Historical Society, Baltimore, MD.
- ² *Maryland Journal and Baltimore Advertiser*, June 15-25, 1784.
- ³ Tom D. Crouch, "The History of American Aviation, 1822-1905," *Aviation Quarterly* 1:2 (1976): 10.
- ⁴ Crouch, "The History of American Aviation," 11 and Jeremiah Milbank, *The First Century of Flight in America* (Princeton: Princeton University Press, 1943), 168-169.

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